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5 1. Field of the Invention

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and a printer engine that prints out only the at least one of the plurality of pages selected by the user.

Further, there is provide a method of controlling a print system including a client device dealing with print data and a print control device connected to the client device. The method includes the steps of a) setting related data for the print data, b) transmitting the related data and the print data from the client device to the print control device, c) storing the related data and the print data in correspondence with each other into a memory of the print control device, d) outputting the related data stored in the memory when requested by a user.

There is also provided a medium storing programs used in a print system including a client device and a print control device connected to the client device. The programs includes the programs of a) setting related data to the print data, b) transmitting the related data and the print data from the client device to the print control device, c) storing the related data and the print data in correspondence with each other into a memory of the print control device, and d) outputting the related data stored in the memory when requested by a user.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig. 1 is a block diagram showing a print system

11;

Fig. 13 is a flowchart representing reprint processes executed in a printer of the print system of Fig. 11;

Fig. 14 is a view showing a screen displayed on a display portion of the computer of Fig. 11; and

Fig. 15 is a view showing a screen displayed on the display portion of the computer of Fig. 11.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Next, preferred embodiments of the present invention will be described while referring to the accompanying drawings.

First, a print system according to a first embodiment of the present invention will be described while referring to Figs. 1 to 6. As shown in Fig. 1, the print system includes a network printer 30 and a client device 40 connected via a network W. It should be noted that a plurality of client devices 40 can be connected to the network W. However, in order to facilitate explanation, only a single client device 40 is shown in Fig. 1.

As shown in Fig. 1, the network printer 30 includes a central processing unit (CPU) 31, a read only memory (ROM) 32, a random access memory (RAM) 33, a hard disk 34, a display portion 35, an input portion 36, an interface 37, and a printer engine 38. The interface 37 of the network printer 30 is connected to the network W.

The CPU 31 performs overall control of the network printer 30 and also executes various control programs. The ROM 32 stores a print control program and various parameters as fixed data. The RAM 33 temporarily stores programs and data required for various processes. The RAM 33 also temporarily stores print data and related data transmitted from the client device 40. Details for the related data will be described later.

The hard disk 34 is a memory mainly for storing print data and related data transmitted from the client device 40. The hard disk 34 includes a print data storage region 34a and a related data storage region 34b. The print data storage region 34a stores a plurality of print data sets in order for each print job. The related data storage region 34b stores a plurality of related data sets in correspondence with the print data sets.

A conversion process, such as bitmap development process, is performed for print data before the print data is stored in the print data storage region 34a. The conversion process is for converting the print data into a format that the printer engine 38 uses when printing. Alternatively, the print data can be stored in the print data storage region 34a without its format being converted. In this case, the conversion process is performed when print processes are performed for the print data.

Specifically, in S2, related image data is prepared for each page of the print data by using either an appropriate application software or an additional function of the application software used in S1. That is, when the print data includes a plurality of different pages, then a plurality of related image data sets are prepared. When the print data includes only a single page, then only a single related image data set is prepared.

It should be noted that even if the print data includes a plurality of pages, only a single related image can be designated for the print data. Also, instead of preparing new images, one or a plurality of related images can be selected in S2 from various images prestored in the client device 40 .

The related image data can be reduced data of print data; predetermined characters, figures, or symbols that represents the print data; user name of the client device 40; or any combination of these. That is to say, any data that enables the user to grasp the correspondence between the related image data and the corresponding print data can be used as the related image data.

Next, in S3, one of the related images for the print data is selected and designated as a representative image. When only one related image is prepared for the print data in S2, then the related image is automatically designated as

between the related data and the print data, and also the representative image is clarified.

Next in S14, the print data is stored in the print data storage region 34a of the hard disk 34. Then, in S15, print operations are performed on the print data if the print command is received along with the print data. Print operations will not be performed unless a print command is received. Then, the routine is ended.

Next, relating data output processes performed in the printer 30 will be described while referring to the flowchart in Fig. 4. The process in Fig. 4 is automatically repeatedly executed at a predetermined timing as long as related data is stored in the related data storage region 34a.

First, the CPU 31 judges whether or not a related data display command has been received. The related data display command is for requesting the printer 30 to display the related data stored in the hard disk 34. The related data display command can be inputted by a user through either the input portion 36 of the printer 30 or the input portion 46 of the client device 40. If the related data display command is inputted through the input portion 46 of the client device 40, then the related data display command is transmitted from the client device 40 to the printer 30.

If a related data display command has been received

representative images stored in the related data storage region 34a, each designated for a corresponding print data set stored in the print data storage region 34a. The screen 70 also displays corresponding management information next to the representative images. In this example, the management information includes a user name, a data ID, a storage date, and a total page number.

A scroll bar 71 is disposed at the right edge of the screen 70. The amount of information that can be displayed on the screen 70 is restricted by the size of the screen 70. In the example of Fig. 5, the screen 70 displays representative images and manage information for only three print data sets at the same time. However, by scrolling the screen 70 using the scroll bar 71, representative images and management information for the rest of the print data sets can be displayed as well.

A page changing button 72 and a print button 73 are disposed at a lower edge of the screen 70. Each time the page changing button 72 is pressed by the user, the screen 70 displays different ones of the related images of currently selected print data set. A print data set can be selected by the user clicking on its representative image using a mouse, for example. When the user presses the print button 73, the printer engine 38 prints out the representative images and management information of either

all or selected ones of the print data sets stored in the hard disk 34.

In the example of Fig. 6, a screen 80 displays all related image and management information of the selected one
5 of the print data sets stored in the hard disk 34.

A print job switching button 81 and a print button 82 are disposed at a lower edge of the screen 80. The print job switching button 81 is for switching the screen to display the related images and management information of the
10 next print data set. For example, when the job switching button 81 is pressed in the situation shown in Fig. 6, then the screen will be switched to display all related images and management information for a data set "DATA B", which is the print data set following a data set "DATA A". The print
15 button 82 is a button for printing out all related images and management information designated for the currently displayed print data set.

In the example of Fig. 6, the screen 80 displays all five related images of the data set "DATA A". However, when
20 a print data set includes more than five pages, then a scroll bar is displayed so that sixth page and more can be displayed by scrolling beyond the fifth page.

It should be noted that the related data screen is not limited to the examples of Figs. 5 and 6. For example, a
25 plurality of related images and management information for a

present embodiment includes a plurality of computers 60, a network W, such as a telephone circuit or LAN, a plurality of network interface cards (NIC) 1, and a plurality of network printers 10.

5 Each computer 60 includes a computer body 56, a mouse
53, and a cathode ray tube (CRT) 54. The computer body 56
includes a CPU 50, a ROM 51, a RAM 52, and a hard disk 55.
The hard disk 55 of the computer 60 stores word processing
software for preparing text and the like for printing, and
10 printer driver software for controlling the printers 10.
The printer driver software includes programs for
transmitting print data. These programs have been installed
into the hard disk 55 from an information memory medium,
such as a floppy disk or a compact disk (CD) into a
15 condition in that the programs can run in the computer 60.

Each printer 10 includes a CPU 11, a ROM 12, a RAM 13, a bus 14, an output interface 15, a reprint switch 16, a print portion 17, a hard disk (HDD) 18, an operation switch 19, and a display portion 20. The display portion 20 is formed from an LCD panel, for example. The hard disk 18 can be a PCMCIA card, which is detachably provided to the printer 10. The hard disk 18 stores print data transmitted from the computer 60, in a job unit. Information on how many print data sets are currently stored in the hard disk 18 is stored in the RAM 13, for example. The RAM 13 stores

a print control program. The printer 10 interprets information from the computer 60 and also performs print processes to be described below by executing the print control program.

5 As shown in Fig. 8, the reprint switch 16, the operation switch 19, and the display portion 20 are disposed on an upper panel portion of the printer 10. In this example, the display portion 20 is for displaying 16 characters. The user can select a desired print job or a
10 desired page by operating on the operation switch 16.

Each printer 10 is provided with the NIC 1 and connected to the network W in a hardware hierarchy. The NIC 1 is connected to the printer 10 through a connection line 9, which is connected to the bus 14. The NIC 1 is provided with a transceiver 2, a RAM controller 3, and a bus 4.

Each NIC 1 is allotted a different IP address, which serves as distinction data. The printer 60 transmits a command with a particular IP address so that the command is transmitted to a desired one of the printers 10 connected to the NIC 1.

Next, a reprint process executed in the printer 10 according to the present embodiment will be described while referring to the flowcharts in Figs. 9 and 10.

The reprint process is usually executed after
25 performing normal print operations. In this example, it is

routine proceeds to S27.

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5 The page selection processes executed in S25 will be described while referring to the flowchart of Fig. 10. First, in S30, the CPU 11 controls the display portion 20 to display a message urging the user to indicate whether he or she wishes to select a particular page of the selected job. If the user indicates through the operation switch 19 that he or she does not wish to select a particular page (S30:NO), then in S37, the CPU 11 retrieves print data for all pages
10 of the selected print job from the hard disk 18, and updates the content of the reprint page table so as to register the print data into the reprint page table. At this time also, if the exact same print data is currently stored in the reprint page table, then it is unnecessary to update the
15 content of the reprint page table. Then, the routine is ended.

On the other hand, if the user indicates he or she wishes to select a particular page of the selected print job (S30:YES), then in S31, the CPU 11 clears the reprint page
20 table. Next, in S32, the user selects a desired page of the print job and inputs the page number of the desired page. Because the reprint process is usually performed after a normal printout operation, the user will normally have all printed pages, so the user can select the desired page while
25 freely referring to these printed pages.

management data and related image data can be prepared at the computer 60 and then stored in correspondence with the print data in the hard disk 18 of the printer 10. By displaying or outputting the related data in accordance with the needs of the user, then the job selection of S23 and page selection of S25 can be more easily performed. Because the related data that has already been stored can be effectively used, the user can visually confirm the print data in a short period of time in order to facilitate a selection of the print data. Therefore, the print processes are more efficient. In this case, it is desirable that the printer be provided with the display portion large enough to display the screen 70, 80 shown in Fig. 5. 6.

Next, a third embodiment of the present invention will be described while referring to Figs. 11 to 15. It should be noted that components that are common to both the second and third embodiments will be assigned with the same numbering and their explanation will be omitted.

The present embodiment describes the present invention applied to a print system with a host computer and a printer connected by a network wherein the network is managed by World Wide Web (WWW) protocol. The WWW protocol is used in an information network that access to a variety of information by building a program called hyper text on the network.

for various operations relating to printing, such as for printer selection and print operations for example, and the user can select a desired operation by pressing the corresponding button.

5 When the user presses any one of the buttons on the
print dialog, then in S41, it is judged whether or not the
user has pressed a button for a reprint operation. If not
(S41:NO), then the routine proceeds to S47 and selected
operation other than reprint operation is executed. On the
10 other hand, if so (S41:YES), then in S42, the CPU 50
transmits a related data request command to the printer 10
for requesting the printer 10 to transmit all related data
spooled in the hard disk 18 of the printer 10.

In S43, the CPU 50 of the computer 60 receives the related data from the printer 10 and displays a reprint process display screen 100 shown in Fig. 14 on the CRT 54 based on the received related data. The display screen 100 displays representative images of each print job as thumbnails 110a, 110b, 110c, and also displays corresponding management information next to the thumbnails 110a to 110c. If the display screen 100 cannot display all representative images and management information at one time, then the user can view all the representative images and management information by dragging a scroll bar 101 or clicking a next page button 102.

are also transmitted to the printer 10, and the present routine returns to S40.

Next, the reprint routine executed in the printer 10 will be described while referring to the flowchart of Fig.

5 13. First, the CPU 11 determines whether or not any command
is received from the computer 60. If not (S50:NO), the CPU
11 waits until a command is received. If so (S50:YES), then
in S51, the CPU 11 judges whether or not the command is a
related data request command. If so (S51:YES), then in S52,
10 the CPU 11 retrieves all related data from the hard disk 18.
Then in S53, the CPU 11 transmits the related data to the
computer 60. Then, the routine returns to S50.

If the received command is not a related data request command (S51:NO), then in S54, the CPU 11 judges whether or not the command is a reprint command. If so (S54:YES), then in S55, CPU 11 receives data ID and selected page numbers of the selected job from the computer 60. Next in S56, the CPU 11 updates the reprint page table of the hard disk 18 based on the data received in S55 in the same manner as in the second embodiment. Next in S57, the CPU 11 performs the reprint process while referring to the content of the reprint page table. Then, the routine returns to S50.

If the received command is not a reprint command (S54:NO), the routine proceeds to S58, wherein other
25 processes corresponding to the received command are

